

Absolute Cross Sections For Electron Impact Excitation in SIII

J. B. Greenwood, S. J. Smith and A. Chutjian

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

Spectral emissions from SIII have been observed in a number of astronomical plasmas, with both forbidden and allowed transitions particularly intense in the Io torus. Electron-ion collisions are often the dominant excitation mechanism and absolute cross sections for this process are necessary to characterize the plasma. Our experiment measures total absolute cross sections by employing a merged beams technique to excite the ions. A detailed description has been given previously[1] but we will be presenting a number of significant improvements. An electron cyclotron resonance ion source has recently been installed to study multiply charged ions observed in high temperature plasmas and a novel electronic aperture has been used at the end of the merged region to filter out unwanted elastically-scattered electrons. Recent theoretical results[2] have predicted many resonances for lower lying transitions in SIII, which provide a dominant contribution to the cross section. We will be presenting our results in comparison to this theoretical work.

[1] S. J. Smith et al., Phys. Rev. A 48 292 (1993).

[2] S. S. Tayal, Ap. J. 481, 550 (1997).

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